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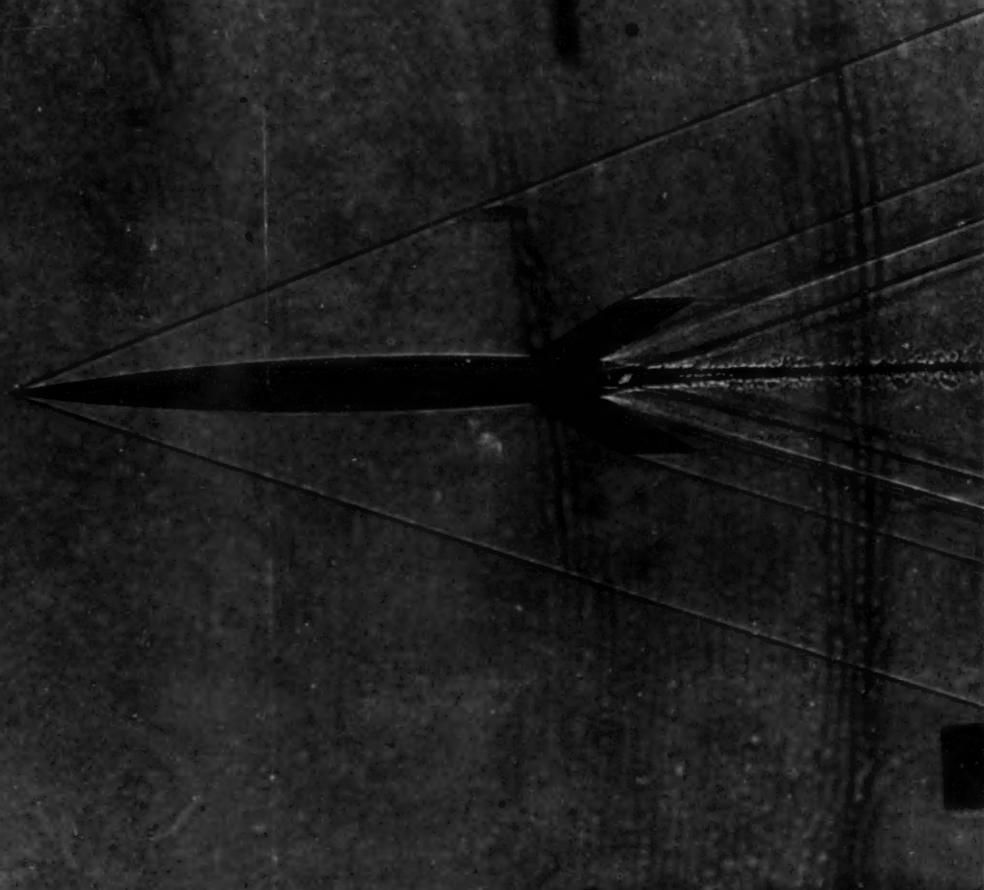
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July 26, 1952

VOL. 62, NO. 4. PAGES 49-64

# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



**Supersonic Free Flight**

See Page 51

A SCIENCE SERVICE PUBLICATION

## FORENSIC MEDICINE

## Time of Death Told By Taking Temperature

► IF YOU ever stumble across a dead body and you are interested in knowing how long ago death occurred, here is how you do it:

Subtract the internal body temperature from 98.6 degrees Fahrenheit, the normal temperature. Divide the result by 1.5. This will give you the number of hours that have elapsed since death.

An editorial in the *Journal of the American Medical Association* (July 12) gives this formula but warns that it is only a rough one. If the corpse is fat, it does not cool so fast. If the corpse is well clothed, that affects the rate of cooling.

It is because of these and other factors that the time of death is not so easily established in real life, or death, as it seems to be in murder mystery stories.

Immediately after death a series of physical and chemical changes take place and these continue in more or less orderly sequence until the remains disintegrate. The body cools, the blood gravitates to the skin, the muscles first relax, then stiffen and then relax again, there are chemical changes in the blood and tissues and finally—putrefaction.

The rate at which putrefaction sets in varies enormously. It depends upon the health of the person involved, on his age, on the heat of the day.

An insect expert may be able to aid in determining the time of death by studying the kinds of insects that attack the body.

*Science News Letter*, July 26, 1952

## METEOROLOGY

## Jet Stream Predictions Are Now More Accurate

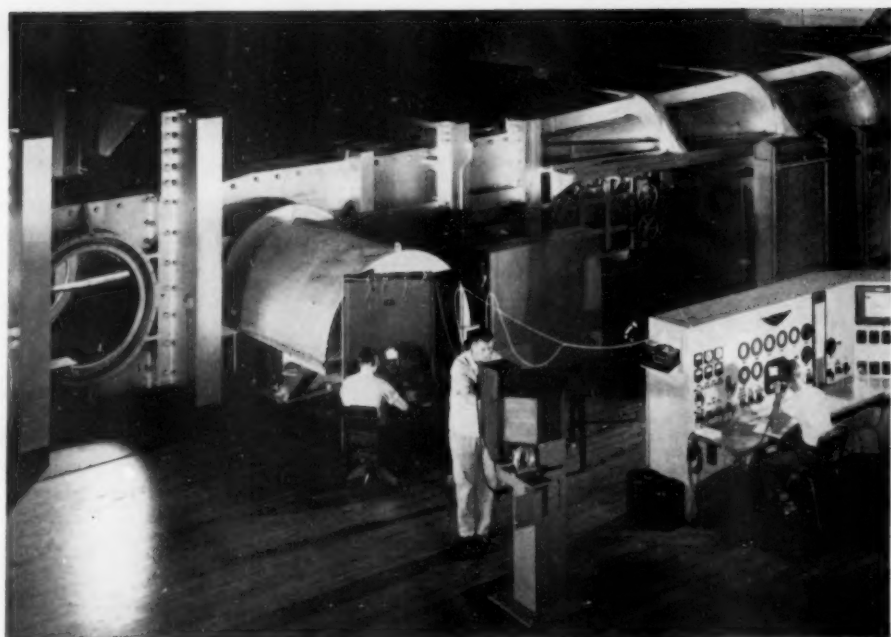
► JET STREAMS, those powerful, 200-miles-per-hour wind currents which are found 30,000 feet up, can now be predicted with greater accuracy.

This is important to high flying Air Force bombers and fighters and is becoming more important to commercial airlines as they fly higher and faster. A 200-miles-per-hour head wind can make hash of an airliner's schedule.

The new method, still in its experimental stage, was developed by Dr. Herbert Riehl of the University of Chicago and Capt. C. O. Jenista of the Air Force. The first month's trial showed better results than had ever been achieved before.

The weathermen used a formula by which they could calculate the rate of propagation of the lines on a weather chart indicating points with equal wind speeds. This gave them answers to the questions of how fast the jet stream would be 24 hours from now and what its direction would be. Their findings appear in the *Journal of Meteorology* (June).

*Science News Letter*, July 26, 1952



**SUPERSONIC WIND TUNNEL**—The test chamber, housing the controls, instruments that record research data and the section of the tunnel where models are tested, is shown in this photograph of the National Advisory Committee for Aeronautics' six-by-six foot tunnel in operation.

## MEDICINE

## Polio Preventive Trial

Second large-scale trial of gamma globulin for preventing infantile paralysis made in Iowa-Nebraska area. Aim is to inoculate 16,500 children, half with harmless substitute.

► THEY LINED up for "G.G. shots" in Sioux City, Iowa, during this past week for the second large-scale trial of gamma globulin as a poliomyelitis preventive.

First of these trials, under the direction of Dr. William McD. Hammon of the University of Pittsburgh, concluded at Houston, Tex., on July 12. A total of 33,137 Houston youngsters aged one to six were given the "shots." Half of them got gamma globulin, half a harmless substitute identical in appearance. (See SNL, July 12, p. 19.)

In the Greater Sioux City area, center of Woodbury County, Iowa, and Dakota County, Nebr., the children were in the age group one to 11 years. The aim was to give "shots" to 16,500 children during the six days from July 21 through July 26. The age group was picked because 67% of the polio cases in the area are among children in these ages.

The Sioux City area was picked because it is becoming one of the nation's hot spots for polio. Latest reports to the U. S. Public Health Service show cases in Iowa jumped to 72 for the week ending July 12 and to 35 in Nebraska. (See p. 62.)

The trials in Sioux City, as in Houston, are being made under a grant from the National Foundation for Infantile Paralysis

with blood gamma globulin furnished by the American National Red Cross. Local doctors and nurses are assisting the National Foundation team in giving the "shots."

Further such trials will probably be made as the polio season progresses. Object is to learn whether gamma globulin from pooled plasma from blood banks contains enough polio-fighting antibodies to protect youngsters from the disease. The protection will not be lasting, but probably will be long enough to see the child through one polio season at least.

Which child gets gamma globulin and which gets the harmless substitute will be known only to the master statistician who will check all the records to see how many, if any, of the children given gamma globulin escaped polio compared with those who did not get this blood substance. It will be three or more months before his report.

*Science News Letter*, July 26, 1952

Attracted by lights, *moths* of the genus *Hylesia* often swarm to tankers anchored at the Maturin Bar in Venezuela; as they brush against the crew or beat against the ship, their finely barbed hair comes off and gets in sailors' skin, giving them "the butterfly itch."



## AERONAUTICS

# Machines for Future Wars

Human pilots will not be needed for planes streaking through atmosphere at hypersonic speeds as automatic machines are being developed to do the job.

## See Front Cover

► **FUTURE WARS** a decade or more from now will be fought by high-flying automatic machines unmanned by human pilots. Devastating bombs will be chased by intercepting missiles at speeds, heats and altitudes that the human body cannot stand.

This is evident from the aeronautical research results obtained at the Ames Aeronautical Laboratory of the National Advisory Committee for Aeronautics, Moffett Field, Calif.

The fastest that man has flown is probably in excess of the 1,300 miles per hour achieved last year with a Navy NACA experimental plane, the Douglas D-558-II Skyrocket at Muroc, Calif. This is twice the speed of sound. Not long ago sound's speed was considered the mysterious and unsurmountable barrier to rushing through the air. Our combat planes can do or are about to do spurts of somewhat better than the speed of sound.

This is obviously only the beginning. In the NACA wind tunnels where the planes and missiles of the future are being born, the hypersonic region is being explored.

The hypersonic region begins at Mach 5, which means five times the speed of sound.

At more than five miles aloft, where superplanes must fly, Mach 5 is 3,300 miles per hour.

There are barriers to piloted flight at such speeds. Man may never fly at such speeds except momentarily for the sake of science. He will not have to. His machines, devised by skill and brains, will do it for him.

Heating is the newest formidable barrier when planes and missiles are pushed through the air. At three times sound's speed, the friction of the air produces a 600 degrees Fahrenheit temperature. At five times sound, the temperature may reach 1,600 degrees.

This would melt most metals to flabbiness, roast the crew and burn up the equipment.

This heat is created in the thin boundary layer of air around the aircraft. For short spurts of ultraspeed it will not soak into the craft. But for sustained flight, even test planes such as the experimental Skyrocket must be virtually flying refrigerators with enough cooling for a large theater.

Remodeling the human body to withstand high temperatures is impossible but titanium and other such metals will be used to beat the heat effect on the structure. Already a stainless steel research airplane has

been built, the Bell X-2. It is another big job to remodel the electronics of the guiding mechanical brain, radar and communications to withstand the high temperatures. Fuel must be protected from evaporating and boiling away. Control becomes more difficult. Drag produced by the skin friction of the craft limits range. It is a tough problem but not impossible.

Secrecy has been lifted enough to make it sure that the future's flying will be rigidly impersonal. Machines will be pilots. Men on the ground will merely start things. Those who risk their lives will be the millions at whom the future's super bombs are aimed.

The potential air battles of the 1960's are being fought in our aeronautical laboratories today. Science fiction may glibly talk of other worlds and space ships. The realities of future aeronautics are more exciting, more important and much, much tougher.

Shown on the cover of this week's SCIENCE NEWS LETTER is a model missile streaking through an Ames' wind tunnel at 2,500 miles per hour. The shadowgraph shows shock lines streaming back from the model's needle nose and tail surfaces.

Science News Letter, July 26, 1952

## ELECTRONICS

## Boom in Requests for Educational TV Channels

► **AN UNEXPECTED** boom in applications for non-commercial educational television broadcasting licenses has surprised some Federal Communications Commissioners since the FCC took television station construction permits out of the deep freeze last April.

FCC Commissioner Frieda B. Hennock told SCIENCE SERVICE that nine applications for educational video stations already have come in from California, Florida, Kansas, New York and Texas. The FCC has set aside 242 channels for educational TV.

Miss Hennock said she is "thrilled" so far at the educational television boom. She said the Emerson Radio and Phonograph Corp. helped get the ball rolling when it announced it would give a \$10,000 grant to the first 10 educational licensees to begin regular operation.

Apparently the boom still is gaining momentum. The state of New York, trying to forge an educational TV network, already has applied for reserved UHF channels in Albany, Buffalo, Rochester, Syracuse and New York City.

The New York educational network will be used by public schools and colleges on a cooperative basis. Programs will originate all over the state and will be relayed to other network stations. Programs to be screened locally also are being planned.

Other applications have been filed for educational stations which are to serve the San Francisco-Oakland area in California; Miami, Fla.; Manhattan, Kans., and Houston, Texas.

Science News Letter, July 26, 1952



**SWEPT-BACK WINGS**—With models such as this, aeronautical engineers of the National Advisory Committee for Aeronautics are gaining advanced knowledge concerning the performance of highly swept-back airplane wings at speeds faster than sound.

## METEOROLOGY

# Fire Weather Forecasts

► DETAILED FIRE weather forecasts are helping to cut down on the nation's losses from forest fires.

Meteorologists of the U. S. Weather Bureau's fire weather service are now working in forest areas, warning of the approach of the kind of weather that makes fires hard to control.

Dry, warm weather with high winds make for the kind of weather in which fires start and in which they are hard to control. Wind directions are important too.

The detailed forecasts play a key role in determining the deployment of fire-fighting forces. On some days when visibility is expected to be good, and conditions of humidity, wind and temperature in the forest will be such that fires are not likely to start, only a few of the lookout towers need be manned.

On other days the forecasters warn of danger. Then lookout towers are fully

manned and airplane patrols supplement them. Fire crews are assembled at strategic places and certain forests may be closed.

Whether or not logging operations may continue is often determined on the basis of fire weather forecasts. Railroads are requested to take special precautions about sparks from locomotives, when the weather is dry and the winds high.

Forestry employees supplement the already existing network of weather observation stations to get a clear picture of meteorological conditions in the forests. On this basis the predictions are made. These are coordinated with knowledge of forest conditions.

During a fire, special predictions may often determine how the fire is to be fought. Predictions of changes in wind direction, especially, can drastically change the plans of the fire-fighters.

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## TECHNOLOGY

# More Electric Railroads

► SIX MONTHS of road tests in regular service, now completed, have proved the success of electric locomotives using the so-called Westinghouse ignitron.

This converts alternating current from the overhead trolley line into direct current to operate the motors that drive the locomotive.

Ignitron locomotives represent a completely new principle of electric-locomotive operation, Westinghouse scientists say. Single-phase alternating current from the trolley is rectified by means of sealed ignitron tubes.

The direct current output of the rectifier is supplied to series-wound direct current traction motors to drive the locomotive. The system combines the economies of the alternating current trolley power with the tractive advantages of direct current driving motors.

Low-voltage direct-current traction motors cost less than the alternating-current commutator type and require less maintenance, the *Westinghouse Engineer* (July) states. The commutator motor serves its purpose well but has high first cost and high maintenance expense.

On the other hand, a high-voltage alternating-current trolley system reduces transmission losses and lowers first cost of electrification in comparison with direct-current transmission.

A pumped-type of ignitron tube for a rectifier was developed in 1932. The present tube is a sealed type perfected in 1937. This was widely used during World War II for light-metal production, and later on diesel-electric locomotives. A multiple-unit car for commuter service was put into op-

eration in 1949, and the success of this led to the construction of the ignitron locomotives.

Increasing use of electric power for railroads is predicted as a result of the ignitron locomotives. All alternating-current railroad systems in America operate on 25-cycle power, primarily because the single-phase a.c. motor works better at low frequencies.

The ignitron locomotive operates equally well on either 25- or 60-cycle power, the latter being America's principal commercial power. Besides its availability, it has another advantage: locomotive apparatus for 60-cycle operation is smaller and less costly than for 25-cycle equipment.

Science News Letter, July 26, 1952

## MEDICINE

# Blue Lips Made Red In Trial Experiments

► A NEW treatment for "blue lip" disease has been found successful in trials reported by Dr. A. F. Mangelsdorff, assistant medical director of Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J.

The disease is caused by absorption into the body of aromatic nitro or amino compounds. It affects workers in certain industries that use these chemicals, turning the workers' lips blue.

Treatment advised by Dr. Mangelsdorff consists of first, thorough cleansing of the body surfaces of a person who has been splashed by and as a result inhaled fumes of these chemicals. Oxygen inhalation, bed rest and large quantities of sweet drinks make up the rest of the treatment. The blood should be constantly checked for

methemoglobin and if this is above 35% salt solution should be injected into the veins.

Responsibility for preventing this condition rests on industrial supervisors, Dr. Mangelsdorff declared.

Processes for the manufacture of the chemicals should be completely enclosed with control panels away from operating units. Those tools which must be open should be equipped with exhaust ventilation so no poisonous fumes can get to the operator. The work areas should be kept well ventilated.

Science News Letter, July 26, 1952

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## BIOPHYSICS

# Atom Smasher for Cancer

High-powered linear medical accelerator to strike at deep-seated cancer without injuring overlying tissues being developed at Stanford University.

► TREATMENT OF deep-seated cancer with high energy X-rays in every hospital in the nation is the hope of Stanford University scientists who are now building a medical electron linear accelerator in the Microwave Laboratory at Stanford.

The medical atom-smasher will produce an X-ray beam of approximately 6,000,000 volts peak energy. Such a beam, unlike ordinary X-rays, will penetrate to cancerous growth deep in the body without injury to overlying skin tissues. In addition, the apparatus will be compact, flexible and relatively inexpensive.

Two research grants totalling \$63,000 have been awarded for the project by the American Cancer Society and the National Cancer Institute of the U. S. Public Health Service.

Construction of the medical accelerator became feasible as a result of research financed by the Office of Naval Research. The ONR contracts put Stanford scientists to work developing linear electron accelerators for use in physics research as well as for medical and industrial applications.

The work will be directed by two Stanford scientists, Prof. Edward L. Ginzton, director of the Microwave Laboratory, and Dr. Henry S. Kaplan, head of the radiology department at Stanford University School of Medicine in San Francisco.

The medical accelerator will be a smaller, modified version of the ONR-sponsored billion-volt linear accelerator now nearing completion at Stanford. It is expected to push electron particles up into the range of the highest speeds ever attained—better than 185,000 miles per second, or 99.7% of the speed of light. The result will be an atom-smashing beam of electrons equivalent to about 6,000,000 electron volts.

By shooting the beam through a plate of heavy metal, such as tungsten or gold, it can be converted into high-energy X-rays. At this level of intensity the X-rays will reach deep into the body of a patient.

X-rays, through the process of ionization, cause electrons to break away from the atoms of cells which comprise the body tissues. These electrons, migrating within the target area, set up chemical changes which result in destruction of the cancer tissue. Cancer cells, being more susceptible to the X-ray ionization than the cells of healthy tissue, are either badly mauled or demolished.

The scientists thus hope to destroy brain tumors and other deeply imbedded cancer tissue. At the same time the rays will cause relatively little injury to surrounding healthy tissues.

Conventional X-ray equipment, on the other hand, is most effective in treating cancer on or just below the skin surface. When used for deeper penetration, it may cause X-ray sickness or damage to the healthy tissues it must pierce.

Because of the huge power supply needed to activate the electromagnetic fields that produce the beam in existing types of high-energy X-ray systems, they are large and unwieldy. The linear accelerator operates on a different principle and does not require this heavy power input.

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## TECHNOLOGY

## Rubber Lifeboat Insures 70-Degree Temperature

► A RUBBER lifeboat that insures a comfortable 70-degree temperature for 15 survivors in either arctic or tropic waters and can be inflated in 30 seconds has been demonstrated by the U. S. Navy and Coast Guard at Floyd Bennett Field in New York.

The weather protection is maintained in either sub-zero or blistering tropical tem-

peratures by dead-air space insulation in the boat's canopy and floor liner. In dangerous cold, this insulation holds the radiant body heat. In the tropics, the liner can be removed to take advantage of the cooling effect of water against the bottom of the boat, while the canopy gives protection from the sun.

The lifeboat was developed and designed by B. F. Goodrich Company of Akron, Ohio, and the Navy's Bureau of Ships. Half a minute after hitting water in a recent demonstration, the new boat had automatically shed its carrying case, ballooned itself into shape with carbon dioxide and raised the protective canopy. The boat, with survival equipment including 50 pounds of canned drinking water, de-salting kits and 30 pounds of rations, is about the size of a small steamer trunk when deflated.

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## OPHTHALMOLOGY

## Cortisone in Eyes Checks Infection

► CORTISONE IN your eye can be more than a mere medical toast to alleviate inflammations and stop destruction of eye structure.

Drs. Max Fine and Rufus C. Goodwin of the Stanford University School of Medicine, San Francisco, report in the *Archives of Ophthalmology* that local administration of the anti-arthritis drug can hold many eye infections in check until wonder drugs or nature produce a cure.

Science News Letter, July 26, 1952



**SPEEDILY SELF-INFLATED**—In 30 seconds, this new life raft can inflate itself to give 70-degree protection for the 15 men, shown carrying the 230-pound boat.

## AERONAUTICS

# Atlantic Helicopter Hop

Helicopter delivery from America to Europe by the Greenland-Iceland air route may be the method of the future.

► **HELICOPTER HOPPING**, from America to Europe, will probably never compete with airplane flights but may prove to be an easy way to get these essential modern war-aids to U. S. military forces in Western Europe.

This type of aircraft, which came of age about ten years ago, has proved in Korea to be an essential in modern warfare. Helicopters are work horses, delivering men and equipment to forward, hard-to-get-at positions, bringing out injured men and serving as observation stations.

Ordinarily, helicopters are regarded as slow, low-altitude, short-range craft. Usual fuel capacity will not keep them in the air for long periods. Their range is usually less than 500 miles. But for Atlantic hopping without passengers or cargo, supplementary fuel tanks are easily installed in the cabin space.

Using the Labrador-Greenland-Iceland-England route, the overwater legs of the trip are not excessively long. The longest leg is the approximately 750-mile stretch from Iceland to Scotland.

Transatlantic crossing by helicopter under its own power is a mark of notable achievement for this versatile aircraft, the first American version of which made its first flight in September, 1939. This was the Sikorsky helicopter, known as the VS-300, still in an experimental stage. During the next four years it went through a development period during which hundreds of alterations were made, then finally evolved as a successful aircraft.

Perhaps the true age of the helicopter should date from May 13, 1942, when the then Army Air Forces' first successful helicopter took off from a field near the old Sikorsky airplane factory near Stratford, Conn., for Wright Field, Ohio. This was the first cross-country helicopter flight in the western hemisphere. Its success established a definite place in aviation for helicopters.

The idea of an aircraft held aloft and propelled forward by giant blades rotating above it is much older than the present helicopter era. It dates back to the 16th century and a proposal by Leonardo da Vinci, the great Venetian scientist. Little came of his suggestion until the 18th century, when several European scientists developed types of helicopters successful enough to encourage further work.

Igor I. Sikorsky, who might be called the father of the American helicopter, actually began his work on this type of aircraft in 1909 in his native Russia. Forced to lay aside his "dream" craft, he took an active part in airplane development, coming to the

United States later to become a leading figure in American aviation.

In 1937, when news broke in America about a new helicopter, developed in Germany largely by Heinrich Focke and superior to all former types, Sikorsky took up again his plans for a practical helicopter. He persuaded the United Aircraft Corporation, of whose Vought-Sikorsky division he was engineering manager, to set aside money for the development of such a craft. The VS-300 was the first result.

Helicopters today are made in America by many different companies and they are greatly improved over the earlier one-passenger type. Ten-passenger craft are plentiful and even larger ones are being built. Single sets of rotating blades are giving way to dual sets. In a well-known Piasecki ten-passenger helicopter, the rotors are at front and rear, the body hanging below like a giant banana.

The helicopter may never become the backyard machine for every household, as once predicted, because piloting this type of craft is not an easy job. However, better controls are making it easier. Automatic electronic controls, somewhat similar to those used in airplanes, have been developed. These will make blind flying at night and in heavy weather possible and greatly increase the sphere of usefulness of the helicopter.

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## CHEMISTRY

# Hot Rubber Developed

► **IN SCIENCE'S** continual striving to make better synthetic rubber, a way is claimed to produce rubber at ordinary temperatures with qualities that equal superior "cold" rubber.

Through use of a chemical catalyst that is known as Nitrazole CF pilot plant operation has been completed and a short production run of the new rubber has been made in government-owned plants by the Firestone Tire and Rubber Co. of Akron, Ohio.

Firestone officials are enthusiastic about the results while others are not so convinced that the new development will produce such uniform results that the program of refrigerating the plants to the 41-degree-Fahrenheit temperature needed for cold rubber will be made unnecessary.

The new Nitrazole rubber can be made in World War II plants for GR-S rubber production at 122-degree temperatures to

## • RADIO

Saturday, Aug. 2, 1952, 3:15-3:30 p.m. EDT  
"Adventures in Science," with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Walter Grant, director of research, Carrier Corporation, Syracuse, N. Y., discusses "Air Conditioning."

## INVENTION

## Direct Elevators By Remote Control

► **SKYSCRAPER ELEVATORS**, television-directed by remote control, are envisioned in an invention that recently received a patent from the government.

No operator inside the elevator and no buttons for the passengers to push would be the result of use of the invention of Joshua E. Shirley, North Hills, Pa., which received patent number 2,602,524. Furthermore, one operator at a remote control panel, could send several elevators at once shooting up and down and stopping at different floors to pick up and let off passengers.

He points out that, especially in tall office buildings, the banks of elevators take up a great deal of room, and the operators, one to an elevator, take up room which might better be used for the transportation of passengers.

To save this space, Mr. Shirley would install a television camera and a microphone and loudspeaker inside each elevator. These would be connected to a remote control panel. The operator at the panel would have a view of all the elevator doors and he could receive instructions as to floors from the passengers over the microphone installed in the elevator.

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bring about the necessary polymerization. When production and development problems are worked out on the new rubber, it may be possible to obtain even better rubber for future automobile tire treads by using the cold temperatures with different chemicals than are now used.

Still in development, the work on the new synthetic 122-degree rubber will be continued. Regular production in the government-owned plants will be the cold rubber of the present production and even some of the hot rubber such as used in war days.

The catalyst Nitrazole CF is a dye intermediate which is chemically para-nitrobenzene diazonium parachlorobenzene sulfonate. The cold rubber Redox catalyst system uses iron salts and organic peroxides, while the older hot rubber uses potassium persulfate.

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## PHYSICS

# Solve 60-Year-Old Puzzle

Question of whether fluids flowing at uniform rate become turbulent without outside influence settled by electronic calculator. Better jets ultimately foreseen.

➤ A PROBLEM puzzling the minds of scientists for over 60 years has been solved by a mechanical "brain," Columbia University scientists have reported.

Its solution is expected to make it easier in the future for engineers to design better aircraft, steam turbines, hydro-electric power generating machinery and other devices involving fluid flow.

The 60-year-old controversy was about whether a stream of fluid flowing at uniform speed between two parallel plates became turbulent. The scientists have now calculated that fluids of low viscosity when moving rapidly become unstable without any outside influence.

"It was a brute force computation," stated Dr. L. H. Thomas, physicist at the Watson Scientific Computing Laboratory at Columbia, under whose direction the work was done. "The problem took about 150 hours of operating time, equivalent to about 100 years of hand computing."

The mathematical solution on the International Business Machines' Selective Sequence Electronic Calculator, Dr. Thomas explained, is for the "simple, ideal case." A hypothetical example of the problem would be a curtain of water falling between

parallel sheets of glass at constant speed. Flow of fluids in a circular pipe, such as water mains, is known to be stable and was so explained by the 19th century English scientist William Thomson Kelvin.

Since 1888, however, physicists and engineers have speculated on fluid flow between two parallel plates, such as those found in a heat exchanger. A numerical try at the solution was suggested four years ago by Dr. John von Neumann of the Institute for Advanced Study at Princeton, N. J., and a limited number of cases were solved at that time. These were not enough, however, to settle the controversy.

Dr. Thomas worked out a slightly different numerical attack and the equations were then adapted to the giant calculator by Phyllis K. Brown and Donald A. Quarles, Jr., of IBM. The solution was announced in New York by Dr. Wallace J. Eckert, director of the Computing Laboratory.

"Our results have fortunately settled some current arguments in hydrodynamics," Dr. Thomas stated. "Specifically they support the work of Dr. C. C. Lin of Massachusetts Institute of Technology who was able to arrive at some similar results

by using asymptotic formulas. We hope results of this kind will help in the task of obtaining a good theory of turbulent motion," he added.

Dr. Thomas reported this study in the *Physical Review* (June 15).

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## VETERINARY MEDICINE

## Map Battle Lines on New Hog Virus Disease

➤ A RARE virus disease that hits hogs, causing symptoms similar to but not quite so serious as those of foot and mouth disease of cattle, was discussed by veterinarians from 10 states at a meeting in Washington.

They pinpointed spots where attacks have occurred and just how many hogs have come down with the virus. Immediate slaughter and disinfection of contaminated premises was recommended. Known as vesicular exanthema of hogs, the virus has so far been most troublesome in Nebraska.

No serious financial damage has yet been suffered by farmers, since the hogs usually do not die, although they cannot be sent to market until they recover, a matter of a few weeks. The virus, which does not affect cattle or sheep, has been spread recently by feeding raw garbage, so the veterinarians advised that pigs be fed only garbage that has been cooked.

Symptoms of the disease include blisters above the hoof and between the toes, and on the snout and nostrils. The virus has been known in California for about 20 years.

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## AERONAUTICS

## New British Jet Engine Is World's Most Powerful

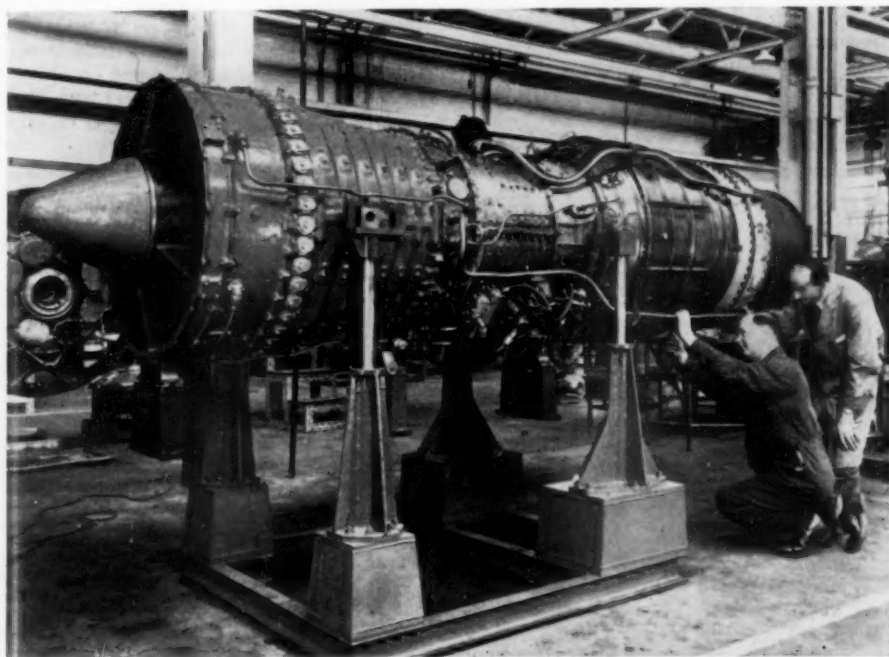
➤ A NEW type of jet engine for airplanes, developed in England and just removed from the secret list, is claimed to be the most powerful jet engine in the world, delivering nearly 10,000 pounds of thrust.

It is the first of what is known as the "two-spool" type and has been named the Olympus. It is a product of the Bristol Aeroplane Company, Ltd. The engine has a published rating of 9,750-pound thrust.

This is about the equivalent of 17,000 horsepower at speeds of 600 miles an hour. With turbines, as with piston engines, the key to high power and economical fuel consumption is the use of a high compression ratio.

High compression ratio from axial compressors is obtained in the Olympus by the use of two compressors in series. One is a low pressure unit and the other a high pressure unit. Each has an entirely independent axial compressor and turbine. The low pressure unit acts as a supercharger to the high pressure unit, and each is driven through concentric shafts by its own separate turbine.

Science News Letter, July 26, 1952



"OLYMPUS" JET ENGINE—The new British turbo-jet engine that delivers 9,750 pounds of thrust is shown here. It uses two compressors in series to get a high compression ratio.

## TECHNOLOGY

**Hard-Wearing Cable Withstands Army Trucks**

► A NEW and tough communication cable for Army telephone and telegraph circuits even stands up under the rumble of heavy trucks running over it constantly.

Saving one-third or 160 pounds of weight per mile, it carries 12 channels instead of the four of the cable it supersedes. Its rubberless vinyl and polyethylene insulating jacket lasts longer and allows the new multiple wire to be used in climates from the arctic to the tropics. It already is carrying messages in Korea.

The cable's up-to-date design should cut production costs \$18,000,000 during the next 12 months.

Developed and tested for almost four years at the Army's Signal Corps Engineering Laboratories, Fort Monmouth, N. J., the cable can be strung on poles, laid along the ground, buried or submerged in water without damage. In contrast to the old cable which could be stored only five years, the Spiral-4, as it is called, can be stacked in storerooms indefinitely.

The cable consists of four separately covered message-carrying wires that spiral around each other. The modern design permits the size of the copper strands to be cut, saving about 16,500,000 pounds of copper annually.

Stainless steel braiding replaces the regular steel covering, adding strength and reducing electrical losses.

With its associated terminal equipment, the cable can carry 12 messages simultaneously over 200 miles of rugged terrain. The old cable could handle only four messages at a time and could carry them only 100 miles.

Science News Letter, July 26, 1952

## NUTRITION

**Summer Salads Can Be Nourishing**

► WARM WEATHER brings the season when salads have a special appeal.

They are both appetizing and easy on the cook, since the ingredients can be prepared before the hot part of the day. But if the family is to be well-fed and nourished on salad meals, the housewife must plan something considerably heartier than a few greens tossed with dressing. The trick in making a main course salad is to use other vegetables besides greens and to add enough meat, fish, eggs or cheese to provide needed protein.

The U. S. Bureau of Human Nutrition and Home Economics suggests the following salads. A two-cup serving for each person provides a complete meal except for bread, beverage and perhaps desert.

Super Supper Salad—½ medium-sized head lettuce, 12-15 leaves chicory, 8 large leaves romaine, 1 medium-sized cucumber, 2 medium-sized tomatoes, 1 cup coarsely cut cooked chicken, 2 hard-cooked eggs, 1 cup

diced cured luncheon meat, 5 pepper rings and 4 small green onions. Serve with a tart French dressing with blue cheese added.

Hearty Chef's Salad—2 cups shredded cabbage, 2 large romaine leaves, 20-24 chicory leaves, 2 medium-sized tomatoes, 6 radishes, 4 cooked frankfurters, 1 cup thinly sliced cooked chicken, and 4 deviled eggs.

Serve with a tart French dressing with chopped onion and green pepper added.

Tropical Chef's Salad—20-24 chicory leaves, 8-10 romaine leaves, 1 cup shredded cabbage, 2/3 cup small pineapple pieces, 1 cup chopped celery, 1 medium-sized cucumber, 1 medium-sized carrot, 1 cup coarsely cut cooked chicken, ½ cup diced sharp cheese, ½ cup finely shredded salami.

Serve with a clear, tart oil dressing.

Science News Letter, July 26, 1952

## ICHTHYOLOGY

**Bounced Sound Waves Spot Lone Fish in Sea**

► INDIVIDUAL FISH swimming in the sea can be spied upon with echo sounders, usually used to measure the depth of the ocean.

Marine scientists have known that fish shoals can be spotted with their sound-bouncing equipment, but now they will be able to follow the reactions of a single fish to learn, for instance, what it does when the temperature of the water suddenly drops several degrees.

The spying on individual fish, as small as 30 inches, with sound waves was reported in the journal *Nature* (July 12) by Dr. F. R. Harden Jones, zoologist of Cambridge University here, and Drs. G. C. Trout, A. J. Lee and I. D. Richardson of the Fisheries Laboratory, Lowestoft. They also found, in studies made from the R. V. Ernest Holt, that sudden changes in water temperature can be spotted with their sound-bouncing equipment.

Science News Letter, July 26, 1952

## GERONTOLOGY

**Work Stops at 65 For Only 50% of Men**

► CONTRARY TO what many people think, lots of men continue working for a good number of years after their sixty-fifth birthday.

At ages 65-69 more than half of all men are still working and nearly three percent are looking for work, Metropolitan Life Insurance Company statisticians in New York report. Even at 70-74 years about 40% are in some gainful activity. Not until ages past 75 does the proportion employed drop below 20%.

These figures are based on unpublished data made available by the Bureau of the Census. The Census figures show that a large proportion of older women, however, are outside the labor market. Almost 87% of women at ages 65-69 are neither working nor seeking work.

Science News Letter, July 26, 1952

**IN SCIENCE**

## SURGERY

**Plastic Instruments For Surgery of Brain**

► PLASTIC INSTRUMENTS for brain surgery, through which the surgeon can see, have been developed by Dr. Frank T. Padberg of the Northwestern University Medical School, Chicago.

He has devised the tools for brain surgery out of methyl methacrylate (Lucite), a transparent, light plastic. They include brain retractors, spoons and a small mallet.

Dr. Padberg says the plastic instruments are superior in many ways to their metal counterparts. They are inexpensive and easy to make. They have a smooth surface and rounded edges, which protect the brain. The Lucite is transparent and the underlying cortex and white matter can be seen. It does not shine reflected light into the surgeon's eyes and it does not conduct electric current.

One set of the instruments, Dr. Padberg reports in the *Journal of the American Medical Association* (July 12), has been in continuous use for more than four years.

Science News Letter, July 26, 1952

## TECHNOLOGY

**Electron Microscope Answers Rubber Riddle**

► AN ELECTRON microscope has solved the riddle of the rubber bushings.

Tests conducted on rubber shock absorber bushings showed some bushings failed, although others remained intact. No apparent reason could be found to explain the difference in performance.

Under the powerful magnification of the electron microscope, samples showed Chrysler Corporation engineers that the good rubber bushings had tiny bits of carbon black mixed into the rubber along with the usual larger-sized particles. Only the larger-sized particles were seen in failures.

Dr. Sumner B. Twiss, head of the engineering division's physical-chemical research laboratories, said it would have been impossible to discover that difference without the electron microscope. Neither the larger nor the smaller carbon black particles could be seen with ordinary microscopes.

The electron microscope has a magnification of 100,000 diameters. Instead of light passing through a system of optical lenses, a beam of electrons passes through electromagnetic focusing fields.

As in a television set, the electron beam bombards a fluorescent screen. Photographs can be made by placing a piece of film beneath the screen. The film responds to the electron beam as it would to light.

Science News Letter, July 26, 1952



# NE FIELDS

## ELECTRONICS

### Transistors Now Have TV and FM Applications

► TRANSISTOR RESEARCH conducted by the Radio Corporation of America has produced a germanium device that may be used in your future TV or FM set.

Formerly restricted to frequencies below 50 megacycles, the transistor now may be used in the very-high-frequency range. Television and FM stations operate in the VHF part of the radio spectrum.

Originally announced in 1948 by the Bell Telephone Laboratories, the transistor is a small germanium crystal to which wires have been attached. It can perform many functions of vacuum tubes, although it is only the size of a corn kernel.

During RCA's experiments on the devices, one transistor operated satisfactorily at a frequency of 225 megacycles, reported B. N. Slade, transistor engineer.

Mr. Slade said a definite relationship exists between the transistor's response to different radio frequencies and the spacing of its wire contact points. The closer the spacing is, the higher the frequency response is.

Further tests showed that a transistor's frequency response and stability also are determined partly by the amount of resistance that the germanium crystal puts up to the flow of an electric current.

Science News Letter, July 26, 1952

## PUBLIC HEALTH

### Polluted Water Can Look Fresh

► POLLUTED WATER can look safe, smell safe and taste delicious, yet be as dangerous as a dose of poison. Just because it bubbles from a spring or runs in a fairly swift current does not mean that it is safe, either for drinking or for swimming.

Remember that when you are tempted to swim or drink at a wayside stream. And teach the children, before the first warm days tempt them to dive into the nearest stream or swimming hole, that typhoid fever and other dangers may lurk in streams.

This is especially true of those in or on the edges of towns and cities that use streams for wastes and sewage.

Many health departments, both city and state, regularly inspect and test the water from springs, streams, pools and lakes. If they find the water safe, a sign saying so is usually posted. In some communities, such as Baltimore, signs warning that the water is not safe for drinking or swimming are also posted. If the spring, pool or stream has no sign to show the quality of its water,

play safe and avoid it. Try to find a supervised, inspected and health department approved pool for the children to swim in.

If you live on a farm or in a small town and have your own well or cistern, you should have it inspected from time to time by the health department. Even if your home water supply has always been safe, there is always the danger of the well walls cracking and allowing polluted water, perhaps from the privy, to seep in. The walls of a cistern should be inspected every time the cistern is cleaned.

City people who have just moved to the country or to a house outside the town with its safe water supply are especially likely to be ignorant of the danger of unsafe water.

Science News Letter, July 26, 1952

## TECHNOLOGY

### Detect Brushes With Inferior Horsehair

► A BETTER buy in paint and other brushes is promised from a bristle test developed at the National Bureau of Standards. It tells whether the brush is made of bristle, which is the hair of swine, or has been adulterated with other fibers, usually horsehair.

Most of our supplies of bristle are imported, with the best grades coming from China. After Korea, bristle supplies fell and prices rose, leading to use of considerable quantities of horsehair in brushes, even though they were labeled pure bristle.

Such adulteration was "of widespread occurrence." A quick, easily-made test that would identify the foreign fibers was needed. Sanford B. Newman of the Bureau staff has now perfected such a test for spotting fibers.

Paper-thin slices of the questioned bristle are examined under a microscope. The color pattern shown by such a cross section is an "accurate and rapid means of differentiating bristle and horsehair," Mr. Newman states. This method is not subject to change because of geographic location, type of hair or location of the hair on the animal.

Science News Letter, July 26, 1952

## INVENTION

### Patent Plane Wings For Supersonic Speeds

► A RADICALLY swept-back wing for airplanes designed to travel above the speed of sound has been invented by Pierre Henri Satre, Toulouse, France, and assigned to the Societe Nationale de Constructions Aeronautiques du Sud-Est. It received patent number 2,603,437.

The new wing is made up of two overhanging elements secured to each side of the fuselage. It is a single-spar type wing and the main spar extends into the area of maximum thickness of the wing. A transverse beam receives a shearing stress from the main spar, making it possible to attach the spar by a pair of supports only.

Science News Letter, July 26, 1952

## MEDICINE

### Millions of Women Are Too Anemic to Give Blood

► FROM SIX to ten million or more American women from the ages of 18 through 59 are too anemic to donate blood, the American Red Cross has found through its blood procurement program.

Compared to one percent of the men, 12.6% of women coming to blood donor stations during an 18-month period had hemoglobin levels below the minimum requirement, Drs. George W. Hervey and Ross T. McIntire and Miss Virginia Watson of Red Cross National Headquarters report to the *Journal of the American Medical Association* (July 19).

If hospital demands for blood continue, greater numbers of women may have to be called on for donations, the scientists point out. Consequently, they state, the anemia found in women of blood donating ages is "bound to engender rising medical interest."

Science News Letter, July 26, 1952

## PUBLIC SAFETY

### Avoid Fire Danger In Summer and Winter

► GUARDING AGAINST the danger of fire is a year round job. Just because the home heating plant is off in summer does not mean you can relax in your vigilance.

In summer, there is the job of helping to prevent forest fires. Hunters, fishermen and vacation campers are being urged to take special precautions to guard against these fires that each year ravage some 30,000,000 acres of forest land besides killing countless numbers of wildlife and fish.

Even if you do not hunt, fish or go camping, you are likely to have at least one Sunday outing in the woods, or a drive through some cool woodland area. The burning cigarette stub or match you flip through the car window may well start a disastrous fire.

Most of the fires in our woodland, 90%, are man-made, the result of carelessness or indifference. And with prolonged dry spells in summer, the need for care is greater than ever. So when you are in the woods, remember to take the following precautions:

1. Care of matches: Be sure your match is dead before throwing it away. Always break it in two.

2. Cigarettes and pipes: Make certain cigarette stubs and pipe ashes are cold before throwing them away. Never throw them into brush, leaves or needles.

3. Making a campfire: Scrape away all flammable material from an area 10 feet in diameter. Build your fire in the center. Always keep it small and never build it against trees or logs or near brush.

4. Putting it out: Never break camp until your fire is out. Sprinkle water over coals and charred sticks. Turn them and drench both sides. Wet the ground around the fire until every spark is dead.

Science News Letter, July 26, 1952

## ASTRONOMY

# Venus Now in View

Three other planets can be spotted in the heavens between sunset and midnight during August. Largest star yet measured directly is in Hercules.

By JAMES STOKLEY

▶ **ALTHOUGH MARS** is the only planet indicated on the accompanying maps, Venus, Saturn and Jupiter are also in the heavens sometime between sunset and midnight.

The maps show the appearance of the skies at about 10 p.m., your own kind of standard time, at the beginning of August and an hour earlier in the middle (add one hour if you are on daylight time).

Very low in the west, just after the sun goes down, one may get a glimpse of Venus if the sky is quite clear in this direction. At the beginning of July the planet sets about half an hour after the sun, while this is lengthened to about three-quarters at the end of August.

Ordinary stars or planets would be quite invisible under such conditions, but Venus is very bright, of magnitude minus 3.3, and so perhaps it can be detected. During the coming months it will come into better and better view, and during the winter will be a brilliant object in the western sky at night.

You can engage in an interesting contest to watch the western sky regularly from now on to see when you can first locate it.

## Saturn More Easily Seen

Saturn, though less than a sixtieth as bright as Venus, is more easily seen. It is in the constellation Virgo, part of which appears on our maps, although the part that Saturn is in is too far to the west. At the beginning of August it sets about 2¼ hours after the sun, while at the end of the month this is shortened to about an hour and a half.

Still later to set is Mars, more than twice as bright as Saturn. It is shown on the map of the southern sky in the constellation of Libra, the scales.

Finally, brighter than any planet except Venus, Jupiter appears about midnight, standard time, at the beginning of August, and around ten o'clock at the end.

Mercury, the last of the planets that can be seen with the naked eye, is not visible at all in August evenings, but will be seen low in the east before sunrise about the 29th.

Brightest of the August evening stars is Vega in Lyra, the lyre, which stands directly overhead at the times for which the maps are prepared. Just to the east of this group we find Cygnus, the swan, with the bright star Deneb, and to the south of Cygnus flies Aquila, the eagle, with Altair.

Low in the south, to the left of Mars, is Scorpius, the scorpion, with the star Antares. This name means "rival of Mars," applied

because of the red color, and with that planet nearby they may be easily compared.

The fifth star of the first magnitude to be seen is Arcturus, in the western sky. It is part of the constellation of Bootes. One way to locate it is to look for the familiar great dipper, which is now in the north-west, with the handle upwards and toward the left. If its curve is followed to the west, it brings you right to Arcturus.

## Largest Measured Star

High in the west on August evenings there appears the constellation of Hercules which, though it contains no star as bright as the first or even the second magnitude, has several claims to interest. One is that it contains the largest star yet measured directly.

Hercules is just above the little semicircle of stars which form Corona Borealis, the northern crown, and six of its stars form the outline of a butterfly.

The body of the insect is formed by the two stars on a line between Corona and Vega, in Lyra. One wing is toward the south and the other to the north, so the figure is divided between our northern and southern maps.

As the great mythological strong man, the butterfly forms the body, while his head is the third magnitude star, Ras Algethi, which is marked by name, so he is in the rather undignified position of standing on his head.

Ras Algethi is one of about a dozen stars big enough, and also sufficiently near, that their diameters have been measured with a device called the interferometer at the Mt. Wilson Observatory. This instrument gives their angular diameter, that is, the angle between two straight lines from the

observer to opposite edges of the star's disk. However, if the distance is known, this can be converted into miles. It turns out that Ras Algethi is some 800 times the sun's diameter, or nearly 700,000,000 miles.

On the western edge of the northern wing of the butterfly, about two-thirds of the way from the body to the tip, there is a hazy spot of light that can be detected with the naked eye only with difficulty and then only with a very clear dark sky.

This is the great cluster of Hercules, a globular mass of something like 100,000 stars that are revealed by the telescope. This object, one of the best known of a swarm of such clusters which surround our main galactic system of stars, is about 35,000 light years away from us.

At such a distance our sun would not be visible even with the most powerful telescope, so each one of the stars we see there must be far bigger than the sun.

Much more prominent than Ras Algethi is another star visible these evenings, likewise one of those whose diameter has been measured. This is Antares, the prominent red star in Scorpius, in the south.

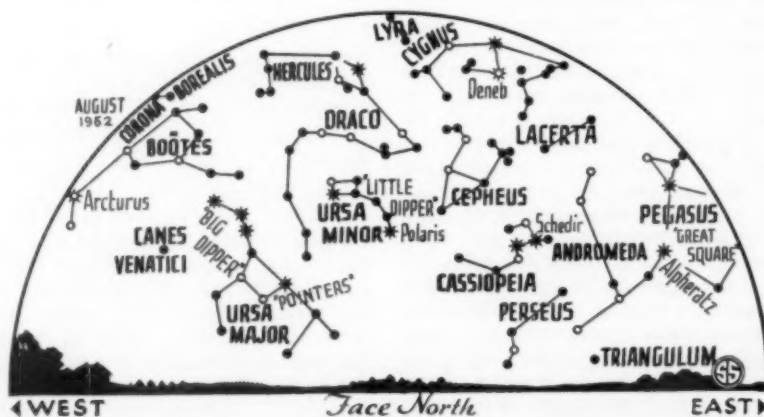
Its diameter is 285 times that of the sun, which makes it about 245,000,000 miles. Its distance is about 220 light years, compared with some 815 light years for Ras Algethi.

## Shooting Star Month

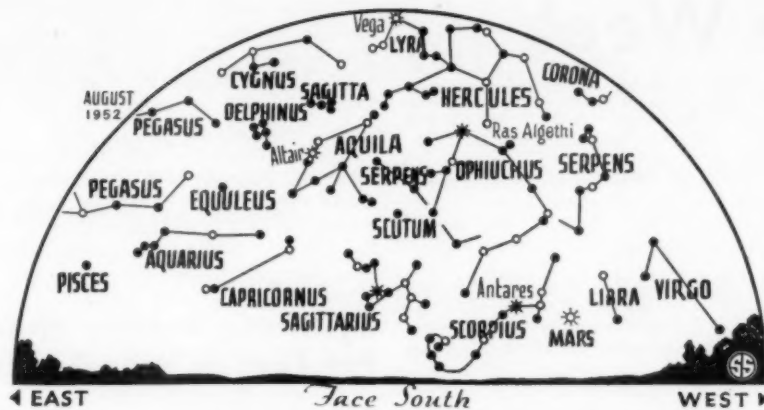
August is generally one of the best months of the year for a display of meteors, commonly called shooting stars. During the night of the eleventh the earth crosses the Perseid stream of these cosmic dust particles, so we then encounter far more of them than normally.

As they are heated by friction with the earth's atmosphere, they burn up in a flash of light that we can see. Although the particles move in parallel paths, these converge in the distance, in the direction from which they came, with the result that they seem to radiate from Perseus.

Since the moon on the twelfth is at last







◊ \* \* ◊ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

quarter, rising at midnight and interfering with the meteors which are most numerous in the early morning hours, the display this year will not be especially good.

August also brings two eclipses, though neither will be visible in this part of the world. On Aug. 5, the moon is partially eclipsed, as seen from Europe, Asia, Africa and Australia.

Aug. 20 brings an annular eclipse of the sun. Such an eclipse is one where the moon does not completely cover the sun, but even at maximum leaves a ring of that orb visible around it.

This effect will be seen along a path crossing South America from Peru, to the southeast through Bolivia, Paraguay, Brazil and Argentina. All of South America, Central America and a little of Antarctica will see the moon partially eclipse the sun.

### Celestial Timetable for August

Aug.	EST	
5	2:40 p.m.	Full moon; partial lunar eclipse visible in eastern hemisphere.
	3:00 p.m.	Moon nearest, distance 221,900 miles.
12	early a.m.	Perseid meteors.
	8:27 a.m.	Moon in last quarter.
	11:44 a.m.	Moon passes Jupiter.
	1:00 p.m.	Mercury in direction of sun.
19	6:00 a.m.	Moon farthest, distance 252,500 miles.
20	10:20 a.m.	New moon, annular eclipse of sun, visible in South America.
22	12:58 a.m.	Moon passes Venus.
24	9:38 a.m.	Moon passes Saturn.
27	11:35 p.m.	Moon passes Mars.
28	7:03 a.m.	Moon in first quarter.

Subtract one hour for CST, two hours for MST, and three for PST.

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### AGRICULTURE

## Buried Block Reveals Moisture Content of Soil

➤ FARMERS AND fruit growers who must depend upon irrigation for successful crop yields soon may have a new tool at their disposal.

It is a block, either plaster of Paris or nylon, through which electricity is made to flow. Buried in the ground, it tells whether the land needs more water.

In describing the new device to the colloidal symposium of the American Chemical Society in Los Angeles, Dr. George J. Bouyoucos, research professor of soil science at Michigan State College, East Lansing, said that irrigation water is scarce and expensive in many places.

"This method," he added, "has revealed that the same yield of crops can be obtained with considerably less irrigation water, bringing about large savings."

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### Basic Books on

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### HOME ECONOMICS

## Scientific Jelly Making

➤ IF YOU are one of those ambitious housewives who likes to make her own jelly, you can do it with less trouble and disappointment than your grandmother had. You can buy the pectin needed to make jelly jell, instead of depending on the uncertain amount in the fruit itself.

Sugar, acid and pectin are three musts for jelly making. All three are present in fruits, but to varying degree. The riper fruit becomes, the less pectin it contains. That is why grandmother used fruits when they were a little underripe for her jelly making. This custom, however, sacrificed some flavor. As fruits ripen some of their natural acids are changed into what are technically termed esters. These compounds give scent and flavor to the fruits.

If you look over grandmother's recipes for jellies, you may find that she added two or three lemons. This was because the citrus fruits are high in pectin content and also in acid, needed to make the pectin set. You may find also that she frequently combined fruits in one jelly, for example, apple and plum, or quince and plum. This was

to take advantage of the larger amount of pectin furnished by the apple and quince.

The acid, sugar and pectin must be used in the right proportions to make the jelly set. One tested recipe from home economists calls for three cups of blackberry juice, four cups of sugar and 1 box of powdered fruit pectin. The rest of this recipe for spiced ripe blackberry jelly follows:

To prepare the juice: Crush thoroughly about 2 quarts fully ripe blackberries (not black caps). Place in jelly cloth or bag and squeeze out juice. Measure 3 cups into large saucepan. Add ½ to 1 teaspoon each cinnamon, cloves, and all-spice or any desired combination of spices.

To make the jelly: Measure sugar and set aside. Place saucepan holding juice over high heat. Add powdered fruit pectin and stir until mixture comes to a hard boil. At once stir in sugar. Bring to a full rolling boil and boil hard ½ minute, stirring constantly. Remove from heat, skim, pour quickly into glasses. Paraffin at once. Makes about eight six-ounce glasses.

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# Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

**BIOCHEMICAL PREPARATIONS:** Volume 2—Eric G. Ball, Ed.—Wiley, 109 p., illus., \$3.00. Practical instructions for making various biochemical preparations.

**DEFENSE MOBILIZATION, THE SHIELD AGAINST AGGRESSION**—Director of Defense Mobilization—Govt. Printing Office, 51 p., illus., paper, 30 cents. This quarterly report reveals that we spent \$8,000,000,000 for defense within the three months just prior to July 1, including new and more complicated weapons.

**FAUNA OF THE UPPER VALE AND CHOZA:** 6, DIPLOCAULUS—Everett Claire Olson—Chicago Natural History Museum, 19 p., illus., paper, 35 cents. There are two species in the Arroyo Formation, this study reveals, one a pond dweller and the other a stream dweller.

**HISTORY OF AMERICAN PSYCHOLOGY**—A. A. Roback—Library, 426 p., illus., \$6.00. Tracing the beginnings of this young science back into colonial days and showing how psychological thought has changed and techniques have developed until they have reached the place of eminence held today.

**ILLUSTRATED KEY TO WEST NORTH AMERICAN GASTROPOD GENERA**—A. Mya Keen and John C. Pearson—Stanford University Press, 39 p., illus., paper, \$1.50. Covers 240 Pacific Coast Molluscan genera.

**JOURNAL OF RESEARCHES INTO THE GEOLOGY AND NATURAL HISTORY OF THE VARIOUS COUNTRIES VISITED BY H. M. S. BEAGLE**—Charles Darwin—Hafner, 629 p., illus., \$7.50. A facsimile reprint of the first edition, published in 1839, of this great classic of natural science. It gives the reader a wonderful impression of what South America, Tahiti and Australia were like in those days.

**THE ORGAN: ITS EVOLUTION, PRINCIPLES OF CONSTRUCTION AND USE**—William Leslie Sumner—Philosophical Library, 436 p., illus., \$10.00. Traces the history of the organ, from the huge and complicated instruments of today back to

the primitive pipes of Pan made from reeds at the water's side, and shows the acoustical, mechanical and electrical principles that govern the working of the organ.

**PICTORIAL ASTRONOMY**—Dinsmore Alter and Clarence H. Clemmshaw—Crowell, 296 p., illus., \$4.50. Intended to make pleasant looking and interesting reading for the layman, this book is also suitable as a text.

**THE RIGHT WAY TO HUMAN FIGURE DRAWING AND ANATOMY**—A. Gladstone Jackson—Emerson, 139 p., illus., \$2.50. A helpful book for all those who want to draw the human figure with accuracy.

**SOMEWHERE IN NEW GUINEA**—Frank Clune—Philosophical Library, 356 p., illus., \$4.50. A writer of travel tales tells of the search for gold that is somewhere in New Guinea, and of the Stone Age people who live there, impervious to progress.

**THE SURINAM CORAL SNAKE: MICUFUS SURINAMENSIS**—Karl P. Schmidt—Chicago Natural History Museum, 9 p., illus., paper, 20 cents.

**TELEVISION TECHNOTES**—Martin Clifford, Ed.—Radcraft, 128 p., illus., paper, \$1.50. Intended for television service men, this book lists the troubles to which different makes are peculiarly subject.

**WHO ARE THE GUILTY?: A Study of Education and Crime**—David Abrahamsen—Rinehart, 340 p., \$5.00. The basic cause of crime, Dr. Abrahamsen finds, is in the home, but that does not exclude other precipitating causes outside the family. Criminal inclinations are symptoms of a deep distortion or sickness of the mind.

**A WORLD APART**—Gustav Herling, Translated from the Polish by Joseph Marek—New American Library, 256 p., illus., paper, 35 cents. A pocket edition of a book originally published by Roy Publishers describing life in Soviet prison and labor camps.

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## AERONAUTICS

# Safer Take-offs in Jets

► ENGLAND'S SUPER-MODERN jetliner is less likely to be victim of a take-off crash due to engine failure than regular piston-engined passenger planes, says Capt. A. M. A. Majendie, one of the two men who planned the introduction into service of the British Comet now flying between London and Johannesburg, South Africa.

Capt. Majendie, who put the ship through some of its early trial tests, said the risk is less of a jet engine failure than of a piston engine failure. And even if an engine failed, he said, the effect would be much less severe. Tests showed little plane swing when an outer engine was cut.

On the whole, the jetliner is simpler to fly than piston-engined planes. Some prob-

lems have been encountered but they have not been due to the jetliner's design.

For instance, navigation has to be much quicker. Capt. Majendie says there is little point in trying to fix position to the nearest mile if it takes 20 minutes to do so. By that time the plane would be 140 nautical miles, or 160 statute miles, from the spot.

Jetliner operating procedures are somewhat different from those of piston-type planes. To save fuel, the Comet's powerful turbine engines are not started until clearance is received from air traffic control. The pilot then taxis the plane directly to the end of the runway, guns and checks the engines, releases the brakes and zooms down the airstrip.

Coming in for a landing, the Comet actually approaches the field much more slowly than many piston-engined planes, Capt. Majendie reports. Landing the jetliner is as easy as landing the best of the older transport aircraft.

Capt. Majendie is sold on the new jet airliner. He says that since he has been flying the plane, he would be "very loath" to return to a piston-engined type.

Science News Letter, July 26, 1952

## TECHNOLOGY

# Synthetic Rubber Hose For Fuel in War Areas

► A SYNTHETIC rubber hose, now being tested at Fort Belvoir, Va., may some day be used to supply gasoline to front-line fighting equipment from safe positions in the rear.

This rubber pipe-line, designed to replace metal piping, can be laid from a truck traveling at 15 miles an hour. It is made of a synthetic that resists deterioration from gasoline or oil better than hose made of natural rubber. A product of the B. F. Goodrich Company, Akron, Ohio, it is manufactured in long continuous lengths by special methods developed by the company.

The 4-inch portable rubber pipe-line is said to be the lightest gasoline hose yet made. It can carry over 40 tons of gasoline an hour.

Science News Letter, July 26, 1952

# Questions

ENTOMOLOGY—How do chiggers attack? p. 43.

...

FORENSIC MEDICINE—What formula can be used to tell time of death from body temperature? p. 50.

...

GERONTOLOGY—How many men stop working at 65? p. 56.

...

METEOROLOGY—Of what aid are fire weather forecasts? p. 52.

...

PHYSICS—What 60-year-old puzzle has just been solved? p. 55.

...

PUBLIC HEALTH—What are the differences between monoxide and food poisoning? p. 61.

...

TECHNOLOGY—How can brushes with inferior horsehair be detected? p. 57.

...

VETERINARY MEDICINE—How is vesicular exanthema of hogs spread? p. 55.

...

Photographs: Cover, pp. 50 and 51, National Advisory Committee for Aeronautics; p. 53, B. F. Goodrich Company; p. 55, British Information Services; p. 62, University of Chicago.



## PSYCHOLOGY

# Drinking at College

**Students whose parents drink are much more apt to be users than those whose families abstain. Beer is preferred by men, wine by women.**

► IF PAPA and Mamma drink, then it is nine chances out of ten that son in college also drinks. And four out of five college men who drink begin their drinking before they enter college.

These are conclusions of a five-year study of college drinking conducted by the Yale University's Laboratory of Applied Physiology in 27 colleges and universities.

Here are some of the other facts and findings of the Yale sampling, conducted by Robert Straus and Selden D. Bacon, with 17,000 students answering questions:

Of the American women students who drink, 65% started drinking before entering college.

Only half of the men whose parents both abstain drink.

When both parents are users, 83% of the women drink on occasion.

When both parents abstain, only 19% of the women students drink.

When family income is under \$2,500, two-thirds of the men and only 30% of the women students drink.

Where the family income is \$10,000 or over, 86% of the men and 79% of the women drink.

Seven out of ten of the men reported the beverage they most frequently use is beer. Only 47% of these men expressed a preference for beer. Approximately 42% preferred hard liquor, but only 21% could afford hard liquor as their most frequent beverage.

Among the women, 41% reported most frequently using beer, although only 17% prefer it. The women prefer wine.

"The customs and attitudes of young persons with regard to drinking," Mr. Straus disclosed, "are already pretty well determined before they come to college—by the practice, attitudes and customs of their families, their social groups and their communities."

Many of the simplest facts about college drinking have not been known, the survey showed.

"In the absence of facts, there has been much conjecture and misinformation and often many sincere persons have acquired quite a distorted impression of the nature of drinking behavior and the problems of alcohol in American colleges," it was declared.

"It is hoped that this study will provide a body of knowledge to replace present wild speculation. The study should prove useful to educators, college mental hygiene and health authorities, and other agencies interested in the problems of alcohol consumption.

"The study also will help create a better understanding of student behavior on the part of persons affected by such activities, such as residents of the college town, alumni and parents.

"The study should help achieve a better understanding of the assimilation of ideas and behavior patterns in youth, the emotional impact of drinking and related behavior on adolescence, and the effects of positive and negative sanctions on drinking.

"The study will contribute to the health, emotional well-being and adjustment of college youths themselves, by providing them with insights into the pressures and motivations associated with drinking customs."

Science News Letter, July 26, 1952

## INVENTION

## Talking Dictionary For Correct Pronunciation

► A TALKING dictionary has been invented by Chester M. MacChesney and Ella B. Wenger, Chicago, and assigned to Ellamac, Inc., also of Chicago. It is designed to give accurate renditions of the pronunciations of words in the hope of avoiding regional differences and dialects. It received patent number 2,603,006.

The dictionary is in card file form, three words appearing on each card. In addition to the definition, a strip of magnetic tape is pasted on the card for each word. The card is placed in a player and the correct pronunciation comes out of the loudspeaker.

Science News Letter, July 26, 1952

## PUBLIC HEALTH

## Confuse Monoxide With Food Poisoning

► WHEN THE whole family comes down with nausea and vomiting, it is likely to be put down to "something they ate," or food poisoning. But some of these cases may be due to poisoning with carbon monoxide gas.

This colorless, odorless gas gives no warning of its presence and is a sure killer if the dose is high enough. But in lesser concentrations it may only cause sickness.

Quite a few outbreaks of disease reported to the New York City Department of Health as food poisoning have, on investigation, been found due to carbon monoxide poisoning, Dr. Harold T. Fuerst, epidemiologist of the department, reports. Nausea and vomiting are symptoms of both, hence the confusion, he points out. He gives the following points of difference:

Diarrhea is the rule in food poisoning and rare in gas poisoning. The reverse is true of headache. Weakness and vascular (blood vessel) collapse occur early in gas poisoning; they occur late in food poisoning as a result of severe vomiting, diarrhea and the consequent dehydration.

The patient with food poisoning is apt to be pale, whereas the patient with carbon monoxide poisoning is likely to have cyanosis or a peculiar cherry red color.

The epidemiologic picture is different in the two diseases. In the case of food poisoning, a group of people who have partaken of a common meal become ill within a limited range of hours from the time the meal was eaten. In carbon monoxide poisoning the people involved become ill almost simultaneously, and there may have been no common meal.

An experienced epidemiologist will suspect gas poisoning if he finds the ill patients in crowded quarters, with all windows closed. A little investigation will often disclose an open, unlighted gas burner, or a defective gas heater or gas refrigerator or a leaking gas pipe. The accidents occur chiefly at night when the patients are asleep and not alert to minor symptoms.

Science News Letter, July 26, 1952

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## GENERAL SCIENCE

## Party Line Difficulties

Soviet scientists trying to follow the country's leaders have difficulty toeing the line. Scientific council acts as watchdog on physiological research.

► IT IS difficult for the Russian physiologist these days to toe the party line in his research even when he tries his best to go along with the Soviet leaders.

This is revealed by rebukes published in recent Soviet scientific literature and newspapers as well as by interviews with Russian refugees. Results of a study of these sources are reported in the journal *Science* (July 11) by Dr. Ivan D. London of the Russian Research Center, Harvard University.

The late I. P. Pavlov is, by political edict, the standard and scientific model of all physiological research in Russia. The USSR Academy of Sciences has set up a scientific council to act as watchdog over all physiological and related research to hold the scientists to the Pavlovian line.

One decree of the Scientific Council criticized plans for research submitted by the scientists Fol'bert and Protopopov, of the Ukraine. Both were condemned for their tendency to "skirt the central problems of Pavlovian theory in favor of peripheral or 'associated problems.'" At the same time they are admonished to "bring their investigations into line with practical needs, even as they engage in fundamental research."

Prof. Fol'bert is especially recommended to tie his investigations more closely to the tasks of medicine and physical education. How the two scientists were to accomplish this contradictory assignment was not indicated.

Academician L. A. Orbeli, who was once a figure of importance and power in the Soviet scientific world, was unseated and discredited by Lysenko for failure to stay in step with Soviet "science," even though he was diligent in affirming his Pavlovian orthodoxy.

He was confirmed in his ignominy by another decree of the Scientific Council which charged him with holding on to his former anti-Pavlovian positions and for trying to represent Pavlov as an empiricist and revealing a pro-Morganist bias in behalf of formal genetics.

Nevertheless, he was urged to pursue his research on the physiology of the sympathetic nervous system on condition that he eliminate his errors.

In each case the scientist under attack was required to "confess" to the justness of the criticism and to recant his anti-Pavlovian views.

Science News Letter, July 26, 1952

## EPIDEMIOLOGY

## Polio Cases Jump 70%

► POLIOMYELITIS CASES took a 70% jump for the week ending July 12, state telegraphic reports to the U. S. Public Health Service have shown.

The total for that week was 1,047 compared to 621 for the previous week. The July 12 total, however, may include some cases unreported during the week ending July 5 because of the July Fourth holiday.

The outbreak this year, which seems to be spreading all over the nation, may rival that of 1949. Then, as now, weekly totals went over the 1,000 mark by the end of the second week in July, whereas last year the weekly total did not reach the 1,000 mark until the last days of July and the first of August.

Texas is still the hot polio spot of the nation, with 296 cases, compared to 186 the previous week. California, another early hot spot, reported 46, not much of an increase over the 43 of the previous week.

States besides Texas showing big increases are: Iowa from 27 to 72, Illinois from four to 33, West Virginia from five to 17, Florida from 10 to 38 and Oklahoma from 26 to 47. New Jersey had a large percentage increase,

from two to 10 cases, but the total number is not large for a state with so big a population. New England and New York State so far have been spared from the general polio increase.

Science News Letter, July 26, 1952

## GEOGRAPHY

## Death Valley Lowest In Western Hemisphere

► DEATH VALLEY is the lowest area in the western hemisphere, with a ten-mile area which is 280 feet below sea level. Two spots are officially charted by the U. S. Geological Survey as even lower—282 feet below sea level. This is two feet lower than the previously acknowledged lowest-down point.

The elevation of the valley floor may vary from time to time, because the rough surface of salt may be floating on brine about three feet beneath. The floor of Death Valley therefore may rise and fall slightly with the condition of the water table.

Science News Letter, July 26, 1952



**ANCIENT BRONZE CAT**—Sacred to the Goddess of Joy was this bronze Egyptian cat, believed to be over 2,000 years old. The old Egyptian word for cat was "miu."

## PHYSICS

## Siren's Sound Intensity Equals 2,000 Orchestras

► A SIREN whose intensity of sound equals 2,000 symphony orchestras hitting the peak of a crescendo simultaneously or the combined population of Los Angeles sounding "C" below middle "C" fortissimo has been designed by two University of California at Los Angeles physicists.

Drs. Isadore Rudnick and Robert W. Leonard, who want to learn more about how sound energy is converted into heat, designed what is thought to be the world's largest siren, producing one of the world's most intense sounds.

It was built and is now being operated under contract with the Office of Naval Research by the Sounddrive Engine Company of Los Angeles, under the technical supervision of Drs. Rudnick and Leonard.

An initial result of the study, say the scientists, is the observation that the greater the frequency or intensity of sound the greater the percentage of sound energy that is converted into heat energy.

The research has also demonstrated that sound waves of high intensity after a short period take on a shock wave characteristic. This emphasizes a correlation between acoustics and aerodynamics, a relationship heretofore little explored.

While these observations are of more immediate concern to scientists, there are practical aspects to the study.

For example, greatly improved mufflers for testing facilities of jet engines may be developed. This promises some relief to those who work in or live near plants producing the engines.

Science News Letter, July 26, 1952



## OCEANOGRAPHY

# Air Force on Ice Island

**Soviet feat of 1937 may be outmatched by airmen on ice island expected to drift out of the Arctic Ocean and down Greenland's coast.**

► AN ICE island occupied by an Air Force crew 108 nautical miles from the North Pole has a "very definite chance" of drifting out of the Arctic Ocean and down the east coast of Greenland.

This is the opinion of Lt. Col. Joseph O. Fletcher, who discovered the island, drifting in the Arctic Ocean several years ago. He was on the island, along with scientists and a weather observation crew from March 19 until June 23.

If the island, about nine miles long, does drift down into the Atlantic, it will duplicate, and might well outdo, the feat of a Soviet Russian crew in 1937. The Russians landed on an ice floe at the North Pole and stayed on it until it broke up almost two-thirds of the way down the Greenland coast.

The island, known as T-3 or Fletcher's Island, is a lot bigger and many times thicker than an ice floe and would not break up as quickly as would a floe.

T-3 is one of three such islands discovered by members of the Air Weather Service on flights over the Arctic Ocean to the Pole from Alaska. It is believed that they broke off from a huge ice shelf on the coast of Ellesmere Island off the northern coast of

Greenland. Extensive search over a 400,000 square mile area revealed no more such islands.

A weather observation station has been operating on the island since April 1, sending surface and upper air observations to the United States to be coordinated with other observations from all over the world. Since the Arctic is known as the "home" of the weather, these observations add considerably to the weathermen's predictions.

Two scientists from the Air Force Research Center at Cambridge, Mass., are also on the island. They make soundings of the ocean's depth, take samples of marine life—mostly shrimp—examine the structure of the ocean floor, test the ocean water for its salt content and get temperature data from a bathythermograph which they lower to about 2,000 feet.

The most significant thing about the camp on the ice island, according to Col. Fletcher, is that we have proved that we can maintain men there with a minimum of logistic support. With the airplane, we can come and go at will over the face of the Arctic Ocean, he said, pointing out that now this is a "fairly hospitable area."

Science News Letter, July 26, 1952

## PUBLIC HEALTH

## Alert on Insecticides

► THE NATION'S doctors are being alerted, through the *Journal of the American Medical Association* (July 19), to the danger of accidental poisoning from one of the new insecticides, toxaphene.

Deaths of three children, poisoning with recovery of a fourth, and group poisonings involving seven persons are reported by Drs. Lemuel C. McGee and Howard L. Reed of Wilmington, Del., and Dr. James P. Fleming of Hearne, Tex.

The children, all four years or younger, are believed to have been poisoned by drinking a solution of the insecticide or by chewing the amber-colored, wax-like material while playing. The seven other persons were members of two families who ate collards and chard that had been sprayed with the insecticide.

Because toxaphene does not dissolve in water, washing the greens, which was done, will not remove the chemical, the doctors point out.

A convulsion is the "cardinal symptom" of poisoning by this chemical, the doctors warn. The poisoning starts abruptly, without pain, involuntary vomiting or diarrhea.

Barbiturates are the antidote to use. The quicker acting ones are considered more effective, a report from the AMA Council on Pharmacy and Chemistry states. These sleep-inducing drugs act by countering the acute central nervous system stimulation of toxaphene.

With proper precautions toxaphene can be used safely, as shown by "the complete absence of poisoning" in workers who manufacture it and those exposed to it in compounding pesticides and using it in agriculture.

Science News Letter, July 26, 1952

## ENTOMOLOGY

## Chiggers Do Not Burrow But Attack as Ticks Do

► CONTRARY TO popular belief, chiggers do not burrow into the skin and stay there. They attack as ticks do, usually in skin depressions at the base of hair.

They usually attack the legs and accumulate in regions where bands, such as belts and girdles, bar their movement. After

they have fed, they back off and drop off. The poison they secrete, which is what causes the intense itching and irritation, stays for some time. Besides the itching, there is danger of infection from scratching.

People have used everything from kerosene to chloroform to stop the itching of chigger bites. Authorities do not advise either kerosene or chloroform, however. Neither is safe unless very carefully used. Washing with soap and water or with plain water or salt water are advised. This should be done as soon as possible after getting into a chigger infested area. Just brushing with a cloth or towel will get the chiggers off.

You might ask your doctor about some of the new itch remedies for use on chigger itches and mosquito bites. Some of the antihistamines are prescribed to be taken internally to relieve hives. Some are being made into ointments or lotions to put on the skin for relief of intense itching. If your doctor does not want you to use one of these, he will prescribe some other soothing lotion or cream.

Science News Letter, July 26, 1952

## Do You Know?

Dental decay probably is the most widespread of all diseases.

Americans hold the record as coffee-drinkers; they consume more coffee than all other people in the world.

Irrigation studies show that a half inch of water applied every six days gives best results with vegetable crops.

In Germany, food yeast has been produced commercially from waste carbohydrate substances.

Despite its abundance of raw materials, the United States has to depend largely on imports for its mica supply, because of high labor costs.



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❁ **BALL-BEARING ROLLERS** make it easier to open and close drawers, sliding doors, showcases and filing cabinets by cutting down sliding friction. The ball-bearing assembly can be glued into woodwork or fitted by means of attached flanges.

Science News Letter, July 26, 1952

❁ **HEAVY-DUTY GREASE** lubricant containing permanently suspended lead dust is designed to cover working parts of gears and bearings so that the actual surfaces are protected. In older equipment, the lead resurfaces the pits and score marks, somewhat restoring the bearing surfaces.

Science News Letter, July 26, 1952

❁ **RADIATION DETECTOR** will measure from 0.02 to 500 roentgens per hour on a single, easy-to-read logarithmic scale. Designed for radiation monitoring in the field by civil defense, military or industrial personnel, the battery-operated, palm-sized device requires no warmup and has a plus-or-minus accuracy of 10%.

Science News Letter, July 26, 1952

❁ **WALLPAPERING OUTFIT** is designed for amateurs who want to paper their own walls. As shown in the photograph, the kit contains a paste and a



smoothing brush, paper cutter, scraper, seam roller, casing wheel, plumb bob, chalk and a cleaning sponge. Illustrated instructions are printed on a board especially designed to hold wet brushes while the kit is being used.

Science News Letter, July 26, 1952

❁ **ALUMINUM FILL-SOLDER** for auto bodies takes 50% less heat than tin-alloy solder, fills dents without shrinking or warping the metal, and feathers to a smooth, invisible edge. The solder will stand a 350-degree Fahrenheit infrared bake and will take lacquer or synthetic finishes.

Science News Letter, July 26, 1952

❁ **HAND-AND-FOOT CHECKER** notes beta-gamma contamination of both sides of hands and feet automatically. When a technician working with radioactive materials steps on the machine and puts his hands in paper-lined slots, the unit signals if the worker should be decontaminated.

Science News Letter, July 26, 1952

❁ **PLASTIC DISPENSER** handles either liquid or powdered soap, and is designed for circular or semi-circular industrial wash-fountains. Attached to the sprayhead of the basin, no supporting tube is required.

Science News Letter, July 26, 1952

❁ **WINDSHIELD VISOR** for inside the car reduces sun glare and is easily installed. Made of a flexible plastic that resists warping, cracking or tearing, the visor is stained an optically transparent green.

Science News Letter, July 26, 1952

# • Nature Ramblings •

► **OYSTERS, ESPECIALLY** if served raw, are very likely to provoke that classic wisecrack about the degree of courage that must have been possessed by the first man who ever ate an oyster.

There are, of course, plenty of people who haven't plucked up that much courage even yet. To them the true ostreophile always remarks, "so much the better; it leaves more oysters for me!"

Whoever the first oyster-eater was, he must always remain nameless, for he was prehistoric. There is, however, no need for erecting a monument to his anonymous memory, for he and his numerous descendants have left plenty of monuments to their liking for oysters and other shellfish on beaches all over the world.

There are shellmounds that the uninitiated easily mistake for low natural hills. These are the accumulated relics for oyster-roasts and clambakes that must have gone on continuously for centuries. There are even similar mounds of snail-shells in North Africa—the obvious witticism being that this is the original home of Frenchmen.

## Was It Courage?



But oysters and clams and snails are only the beginning of the catalog of strange foods that people eat in various parts of the world. Insects, both as larvae and adults, are prominent items. Tastiest, probably, would be the grape-bellied honey-ants of Mexico. More widely distributed is the eating of locusts, which are simply big, fat grasshoppers; these dainties are consumed in many lands where locusts swarm, all the way from the Mediterranean basin to the Philippines.

Strange sea dainties are to be found on the menu, too: squid and sea urchins in southern Italy, sea-cucumbers and the giant sea-worm known in its dried form as beche-de-mer in the South Seas, and, of course, the inevitable bird's-nest soup and shark-fins of "real" Chinese restaurants. Raw fish is eaten just about everywhere. Mark Twain recorded, with a proper inlander's shudder, seeing native Hawaiians eating fish "raw and alive!" when he visited the islands years ago.

The chances are that this business of eating "queer" foods was pioneered not by any bold man but by one of our pre-hunting ancestors who lacked the means for killing and cooking larger game.

Certainly our existing simian poor relations are not too discriminating in their choice of tidbits; some species of them at least will eat insects and their grubs, centipedes, scorpions and fat spiders. It may be, after all, that oyster-eating is just an evolutionary hangover.

Science News Letter, July 26, 1952